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History of the Indian Subcontinent

RELATION BETWEEN HARAPPAN AND BRAHMI SCRIPTS

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Relation Between Harappan and Brahmi Scripts

Brahmi Signs:

Though a few variants of the Brahmi alphabet system have been known to exist, with the evolution of Brahmi characters, the core signs are seen to be quite consistent over time. The syntax of their usage has also been found to be roughly consistent throughout this evolution process. Lists of Brahmi numerals, vowels and consonants are provided here in following figures, respectively:

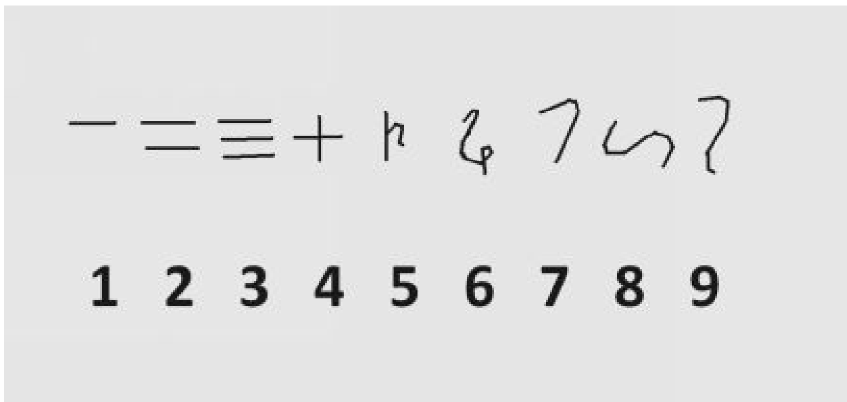


Fig. 1: Brahmi numerals from 1-9.

a	ā	i	ī	u	ū
e		ai	o	-ṃ	
ka	kha	ga	gha		
ča	čha	ǰa	ǰha	ña	
ṭa	ṭha	ḍa	ḍha	ṇa	
ta	tha	da	dha	na	
pa	pha	ba	bha	ma	
ya	ra	la	ḷa	va	
sa, ṣa	ṣa	śa	sa	ha	

Fig. 2: Brahmi vowels and consonants.

These are the commonly used Brahmi characters used over time. As we can see from the lists, few variants of many of the characters have been used. Classical Sanskrit and Prakrit variants use around 49 characters, including 14 vowels, 33 consonants and 2 special characters. The consonants are divided into guttural, palatal, retroflex, dental, labial, semi-vowels, sibilants and the aspirate. However, a few of the Brahmi characters became less commonly used over time, making the total number of commonly used characters at around 45. The vowels that became less and less used over time include r (short), used as in Krsna (Krishna); r (long), used as in pitrnam (pitranam, or of father/fathers), etc.

Of these 45 odd Brahmi characters, as expected with any alphabet, only a few occur in inscriptions most of the times. A frequency-analysis of the occurrence of these characters may be performed. Such study of the frequency of occurrence of signs gives us a good idea about the sounds most prevalent in a given system of writing. The 10 most commonly used consonants in the Brahmi script, roughly based on the descending order of frequencies, is shown in fig.3.



Fig. 3: ten most commonly used consonant sounds in Brahmi.

These 10 symbols together make up more than 70 percent of usage of characters in the Brahmi. The accompanying sounds are among the highest in priority of usage in the underlying language families (Sanskritic or Prakritic, as the case might be). It may be noted that some of the Brahmi characters, like the symbol for 'ra', took a variety of forms. Time and place must have played a big role in determining the form of these symbols being used. Moreover, the underlying language too must have contributed towards making a given sound being more often used than others. For example, both these language families have a tendency to end words with the sounds 'sa' or 'sya'. We find the symbols for both 'sa' and 'ya' to be in the list of most commonly used Brahmi characters for this reason.

As we look at the evolution of the Brahmi signs over time, we find (much expectedly, as with any other script) that there is a tendency of them towards becoming more and more compact and simpler to write. This seems to be one of the most prominent driving forces behind the evolution of scripts. Minor adjustments depending upon time and place are expected though. However, if we concentrate our attention on the 'big picture' of evolution, we inevitably arrive at such a trend. Just to get a rough idea of this, we may consider the evolution of a few Brahmi signs over time into corresponding characters of the modern Devanagri script (a daughter-script). Fig. 5 shows the concerned evolution of a few characters over time.

Apart from the evolution of signs, resulting from a push towards a growing convenience of use, the signs may also shift their places in the list of prominence of use. This shift takes place over time and may also involve local influences of culture. For example, with the evolution of the underlying language itself, a few of the characters (corresponding to various sounds) of a script may become less used, while some others may come to use more often. However, such a shift of the characters in the prominence-list is a very gradual process, generally, leaving behind trail marks of telltale signs for us to investigate.

300 BCE						
200 CE						
400 CE						
600 CE						
800 CE						
900 CE						
1100 CE						
1300 CE						
Modern	क	ज	म	र	स	अ

Fig. 4: Evolution of a few Devanagri characters over time.

In the Brahmi script, apart from the 10 characters included in the priority-list of usage, the symbol or ‘ca’ too is a very often used one. It gained in prominence over time. Other symbols included in the list which seem to have gained in priority of usage, are ‘ta’, ‘va’, ‘ra’, ‘ka’, etc. Symbols that seem to have lost prominence over time, a little bit, include ‘sa’, ‘ma’, ‘pa’, etc.

However, in most cases, this shift is not very pronounced. Most of these shifting of places by the Brahmi symbols, with a few exceptions, averages less than 3 percent, over a period of approximately 1600 years. Some of the exceptions, though, have a much larger shift. Another trend that is to be noted, not only in the Brahmi, but also in any script, is that symbols and sounds, with less probability of occurrence, change their positions very little over time. In fact, less the probability of occurrence of a given sign, less is the probability of it being shifted in the priority list. This is seen to be the general trend with the Brahmi characters and sounds too.

Symbols placed near the top of the priority list, on the other hand, are seen to have a much larger probability of being shifted about. The percentage gain or loss in priority of usage for a few among them may even be quite substantial. Over certain periods of time, a few from these few signs, with a large enough gain or loss in percentage, may be seen to shuffle places to and fro. Studying these over large enough periods, though, reveals that the average all these shifts in percentages is more constant than the individual variations. In a very few (and exceptional) cases only, there may be a sudden and large change in position in the priority list. More often than not such sudden shifting is seen to be resulting from a loss in priority and not from a percentage gain in usage.

The Brahmi family of symbols, being used over a vast area and over millennia, had a number of

variations, as expected. The various symbols used for sounds like ‘ra’, ‘e’, etc., are instances supporting this point. It is such variations in the Brahmi script, depending upon temporal and spatial elements that indeed gave rise to its ‘daughter scripts’ later on. These variations, evolving separately, gave rise to scripts pertaining to Devanagri, Bengali, Tamil, Punjabi, etc.

Harappan Signs:

It is known to us that the Harappan signs were being used in several parts of the Indian subcontinent until around 400 BCE. There seems to be a gradual and natural transformation of these signs into the Brahmi, later on. The total number of the Harappan signs and their derivatives, found till date, are quite a few (around 400), though. But looking deeper, a much smaller core set of symbols emerge and these few signs seem to give rise to the rest, in the form of conjuncts and ligatures. The 10 most commonly used Harappan symbols is shown in fig. 5:

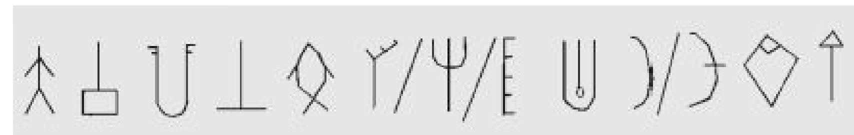
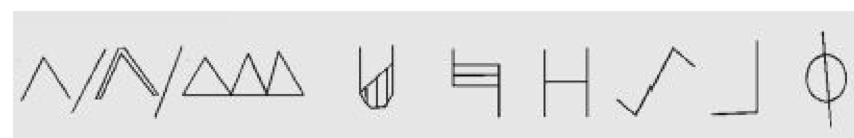


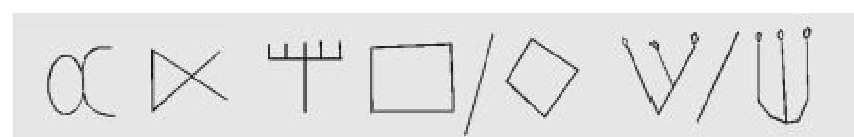
Fig. 5: 10 signs in Harappan that have the maximum frequencies of occurrence.

Around 45 odd signs out of the total number of Harappan signs found make up almost 100 percent of the inscriptions, in some form or other, as said earlier. Out of these 45 signs, around 40 are readily distinguishable. These form an almost exclusive and unique set. The primary signs are seen to have many variants, as in Brahmi. Many of these provide us with quite a vivid picture of their evolution, depending upon the factors of time, place and usefulness. Even minor adjustments in such signs, depending upon these factors, are noteworthy. Here is a list of such signs in the Harappan:











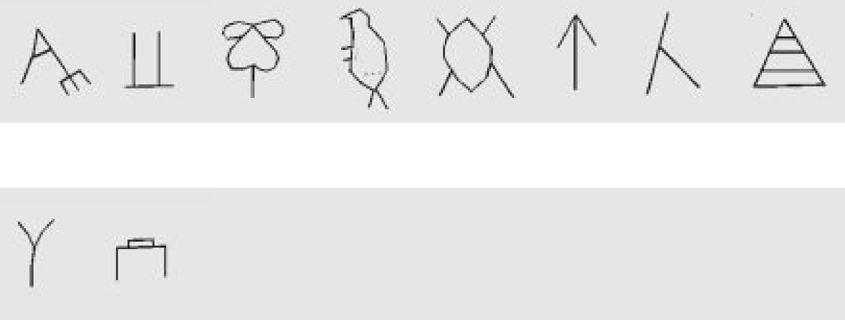


Fig. 6: List of a few basic Harappan signs.

Many of the signs in this list are the same as or are very similar to the corresponding Brahmi signs. These are similarities that simply cannot arise from mere chance. It is also to be noted that the most frequently used signs in the Brahmi look so similar to the most frequent Harappan symbols. The signs for ‘va’, ‘ta’, etc., in the Brahmi script are a few such instances, where we have corresponding same or similar signs in the Harappan. A statistical analysis of usage of both the scripts reveals a further degree of similarity. There are, sometimes, a number of archaic forms of the same symbols found in the Harappan.

The Harappan script transformed naturally into the Brahmi, depending upon the factors channelizing evolution of scripts. We can consider a few examples of this natural evolution and study the natural evolution involved. This is similar to the evolution of the Devanagri and other daughter scripts from the Brahmi itself. Let us concentrate on the letter ‘ta’ in the Brahmi. There is no denying the fact that it is a direct transformation of the corresponding Harappan sign as shown in fig. 8.

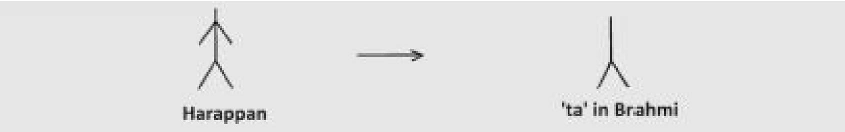


Fig. 7: Transformation of the symbol for ‘ta’

The sign in Brahmi for the sound ‘pa’ is another case in point. Using the principles of compactness, ease of writing and ‘running strokes’, we can very well explain its evolution from the corresponding Harappan sign. Fig. shows this transformation.

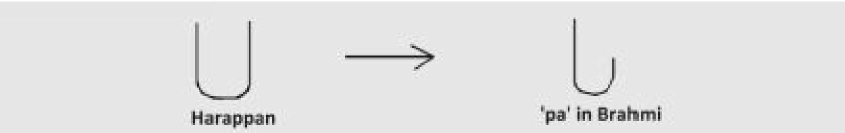


Fig. 8: Transformation of the symbol for ‘pa’

A similar evolutionary trait is seen in the transformation of the symbol for ‘sa’. The ‘urn’ sign in the Harappan is a precursor to the later ‘sa’ in the Brahmi, fig. 9. This symbol is particularly frequent in the copper tablets.



Fig. 9: Transformation of the symbol for ‘sa’

We find many versions of the same symbols, with minor and progressive changes, in the Harappan, as well as in the Brahmi. This very ‘urn’ symbol is a case in point. Such gradual transformation is a feature common not only with the Brahmi family of scripts, but with any script in the world. The evolution of the modern English alphabet and the number system too shares this feature.

The symbol for ‘da’ in the Brahmi is another example in this regard. Its evolution is an excellent example of how a change in orientation brings about transformation, fig. 10.

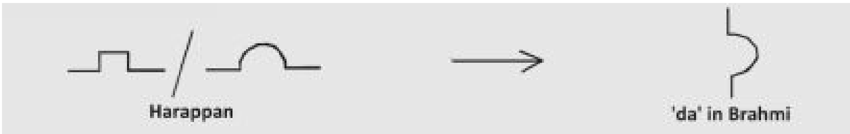


Fig. 10: Transformation of the symbol for ‘da’ (Note the change in orientation).

We find allographs of the same signs in the Harappan inscriptions. This is a clear marker of the change in symbols with evolution of the script. With time, the signs evolved, making them more and more compact and easier to write. The ‘crab’ sign, common in the inscriptions, may be considered as an example, fig. 11.

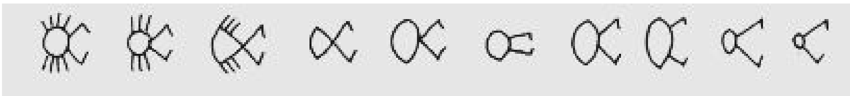


Fig. 11: Transformation of the ‘crab’ sign (After Parpola.)

In fact, both the ‘crab’ sign and the ‘fish’ sign must have evolved together to form the later day variants for ‘ma’. Fig. and fig. shows the conversions involved.

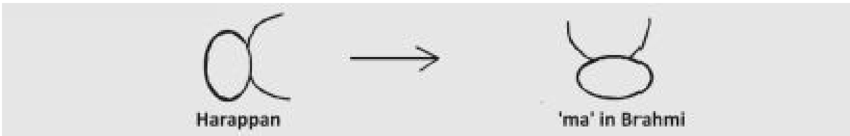


Fig. 12: Transformation of the ‘crab’ sign into ‘ma’ in Brahmi.

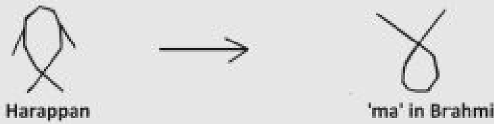


Fig. 13: Transformation of the 'fish' sign into 'ma' in Brahmi.

A similar transformation in shape happened with the symbol for 'pha' in the Brahmi, fig. 14. Here a few strokes are seen to be omitted in later versions, for simplicity of writing.

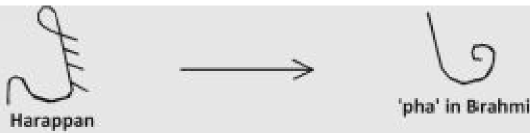
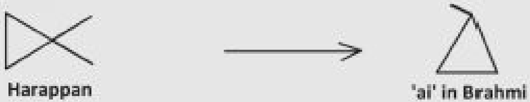


Fig. 14: Transformation of the symbol for 'pha'

Another Brahmi sign that may be considered in this regard is the symbol for 'ai'. Similar to the signs for 'ma', here too we find variants that seem to have evolved from the original variants in the Harappan. Fig. 16 and fig 17 show this conversion.



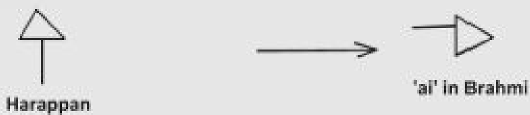


Fig. 15 and fig. 16: Transformation of the symbol for 'ai'

It is possible that we come across a few more intermediate variants of such signs. Finding such intermediates may further enhance our understanding of the evolution of the Harappan symbols into the Brahmi alphabet. Moreover, this will provide us with even better means to script the complete history of this evolution.

References:

Subbarayappa, B. V. (1997), Indus Script: Its nature and structure. Madras: New Era Publications.

Wells, B. K. (2006), Epigraphic Approaches to Indus Writing, Ph.D. Thesis, Harvard University, Cambridge, Massachusetts.

Wright, R. P. (2010), The Ancient Indus – Urbanism, economy and society. New York: Cambridge University Press.

Ganguly, Subhajit (2013) Call Of The Lost Ages: A Study Of The Indus Valley Script, USA.

Yadav, N., Vahia, M. N., Mahadevan, I., Joglekar, H. (2008a), A statistical approach for pattern search in Indus writing, International Journal of Dravidian Linguistics, XXXVII Number 1, pp. 39-52, http://www.harappa.com/script/tatawriting/tata-indus-script-research.html.

Rao, R. P. N., Yadav, N., Vahia, M. N., Joglekar, H., Adhikari, R., Mahadevan, I. (2009a), Entropic evidence for linguistic structure in the Indus script, Science, 324, 1165.

Rao, R. P. N, Yadav, N., Vahia, M. N., Joglekar, H., Adhikari, R., Mahadevan, I. (2009b), A Markov model of the Indus script, Proceedings of the National Academy of Sciences, 106, 13685.

Rao, R. P. N., Yadav, N., Vahia, M. N., Joglekar, H., Adhikari, R., Mahadevan, I. (2010), Entropy, the Indus Script, and Language: A Reply to R. Sproat, Computational Linguistics 36 (4), pp. 795-805.

Rao, S. R. (1982), The Decipherment of the Indus Script. Bombay: Asia Publishing.

Mahadevan, I. (1998), Phonetic value of the arrow sign in the Indus script, Journal of the Institute of Asian Studies 15 (2): 69-74.

Mahadevan, I. (2002), Aryan or Dravidian or neither? A study of recent attempts to decipher the Indus script (1995–2000), Electronic Journal of Vedic Studies (EJVS) 2: 1–23.

Mahadevan, I. (2006), Agricultural terms in the Indus script, Journal of Tamil Studies, Vol. 70, pp. 64-76.

Parpola, A. (1994), Deciphering the Indus Script. Cambridge: Cambridge University Press.

Parpola, A. (2005), Study of the Indus script, Transactions of the International Conference of Eastern Studies, no. 50: 28-66. Tokyo: The Tôhô Gakkai.

Agrawal, D. P. (2007), *The Indus Civilization: An Interdisciplinary perspective.* New Delhi: Aryan Books International.

Coe, M. D. (1992), Breaking the Maya Code. New York: Thames and Hudson.

Bottéro, F. (2004), Writing on shell and bone in Shang China. In The First Writing: Script Invention as History and Process, Houston, S.D. (ed.). Cambridge: Cambridge University Press: 250-261.

Changizi, Mark A., Zhang, Qiong, Ye, Hao and Shimojo, Shinsuke (2006), The structures of letters and symbols throughout human history are selected to match those found in objects in natural scenes, The American Naturalist, Vol. 167, No.5.

CISI = Corpus of Indus Seals and Inscriptions. 1: Collections in India, edited by Jagat Pati Joshi and Asko Parpola, 1987. 2: Collections in Pakistan, edited by Sayid Ghulam Mustafa Shah and Asko Parpola, 1991. 3: New material, untraced objects, and collections outside India and Pakistan, edited by Asko Parpola, B. M. Pande and Petteri Koskikallio, Part 1: Mohenjodaro and Harappa, in collaboration with Richard H. Meadow and Jonathan Mark Kenoyer, 2010, (Annales Academiae Scientiarum Fennicae B 239-241.) Helsinki: Suomalainen Tiedeakatemia.

Baines, J. (2004), The earliest Egyptian writing: development, context, purpose. In: Houston, S. D. (Ed) The First Writing: Script Invention as History and Process. Cambridge University Press, Cambridge, 150-189.

Houston, S. D. (ed.) (2004), *The First Writing: Script Invention as History and Process*, Cambridge: Cambridge University Press.

Hunter, G.R. (1934), *The Script of Harappa and Mohenjodaro and its Connection with Other Scripts*, London: Kegan Paul, Trench, Trubner & Co. Ltd.

Kenoyer, J. M. (1998), *Ancient Cities of the Indus Valley Civilization*. Oxford: Oxford University Press.

Kenoyer, J. M. (2006), The origin, context and function of the Indus script: Recent insights from Harappa, in *Proceedings of the Pre-symposium of RIHN and 7th ESCA Harvard - Kyoto Roundtable*, ed. Osada Toshiki.

Wells, Bryan 1998. *An introduction to Indus writing*. (M. A. thesis, Department of Archaeology, The University of Calgary, Calgary, Alberta, Canada.) Available at: http://www.nlc-bnc.ca/obj/s4/f2/dsk2/ftp03/MQ31309.pdf

Shah, Sayid Ghulam Mustafa, & Asko Parpola 1991. *Corpus of Indus Seals and Inscriptions, vol. 2: Collections in Pakistan*. (Annales Academiae Scientiarum Fennicae, B 240.) Helsinki: Suomalainen Tiedeakatemia.

Sharma, J. P. 1968. *Republics in ancient India, c. 1500 B.C.–500 B.C.* Leiden: E. J. Brill.

Tikkanen, Bertil 1999. “Archaeological-linguistic correlations in the formation of retroflex typologies and correlating areal features in South Asia.” Pp. 138–148, in: Roger Blench and Matthew Spriggs (eds.), *Language and Archaeology*, 4. London: Routledge.

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Subhajit Ganguly is a physicist whose areas of expertise include the Theory of Abstraction. His contribution to the theory is noteworthy, to say the least. The other areas of science that he has made notable contributions to include astronomy, mathematics and the Chaos Theory. Zero-postulation is a new concept he has introduced to the theorizing process in sciences. He is an Advisor to the Figshare Open Science Platform and is an Ambassador for the Open Knowledge Foundation.